Appendix E1

Revised

BIOLOGICAL ASSESSMENT

Activities Related to

Wildlife Habitat, Forest Management, and Roads

Paint Creek Project

USDA-Forest Service
Cherokee National Forest
Watauga Ranger District
Carter County, Tennessee

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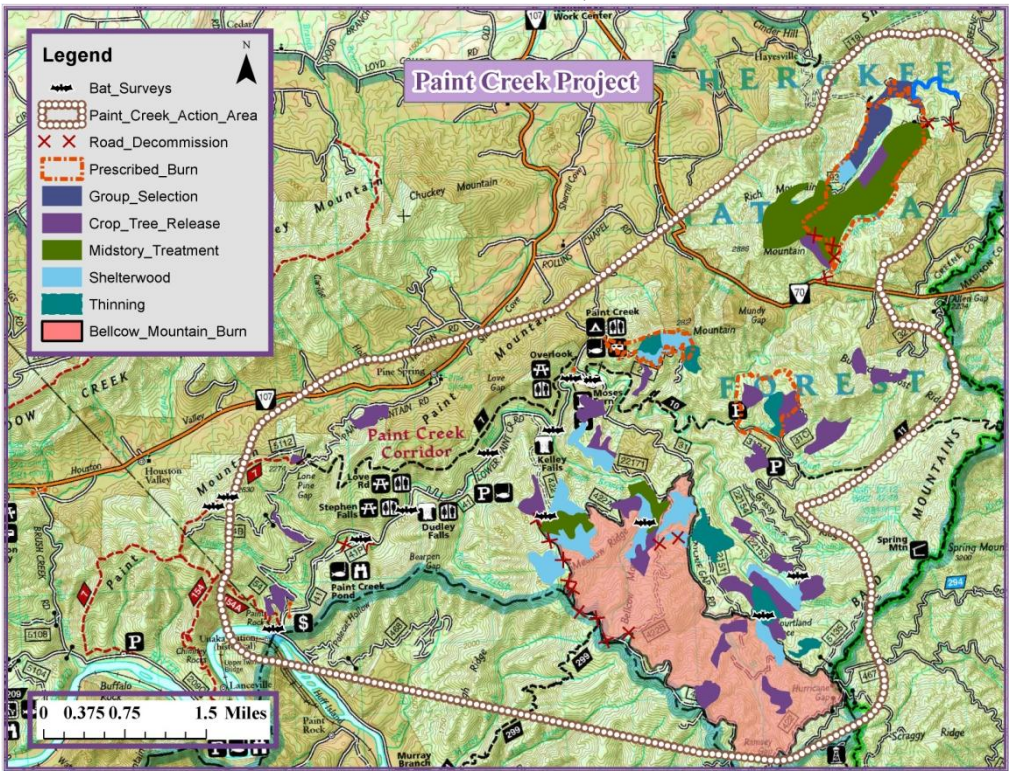
1.0 INTRODUCTION

The purpose of this biological assessment (BA) is to document any potential effects of the project on Proposed, Endangered, and Threatened species (PETS) or their habitats, and to ensure land management decisions are made with the benefit of such knowledge. The objectives of this assessment are to:

1) Comply with the requirements of the Endangered Species Act that actions by federal agencies not jeopardize or adversely modify critical habitat of federally listed species.
2) Provide a process and a standard by which PETS receive full consideration in the decision-making process.

1.1 ACTION AREA AND SCOPE OF ANALYSIS

FIGURE 1. PAINT CREEK PROJECT AREA MAP



The action area (Figure 1) for available habitat, direct effects, and indirect effects on PETS includes activities in the Paint Creek watershed of Greene County, Tennessee (portions of Compartments 205, 206, 207, 209, 210, 213-219, 223, 262, and 264). The action area was determined based on the geographic extent of the all combined project effects (terrestrial and aquatic). A 0.4 mile buffer was placed on the project activities to consider bat home ranges. The environmental baseline includes past/present impacts of all Federal, State, and private actions in the action area and future Federal actions with existing section 7 consultations. The timeframe considered for past actions is the last five years, based on timeframe of potential impacts and guidance from the US Fish and Wildlife Service (FWS). The Bellcow Mountain Burn (1,818 acres) is planned for 2014-2015; no other actions affecting PETS have occurred in the last five years.

Approximately 16,032 acres of Forest Service Land occurs in the watershed. Aquatic habitats in the affected areas include coldwater streams in the Paint Creek and Back Creek watersheds. Elevations of affected areas range from 1,920 to 3,920 feet MSL. No northern hardwood forest occurs in or near any affected areas. The slopes in the affected areas are mostly of southerly aspect. Table 1 lists the terrestrial habitats available in the project area.

TABLE 1. TERRESTRIAL HABITATS OF THE PAINT CREEK WATERSHED

Major Forest Communities	**Acres**	**Percent of Area**
Mesic deciduous (MDF)	7,464	47%
Eastern Hemlock/White Pine (EHWP)	1081	7%
Oak & oak-pine (OOPF)	8,560	53%
Pine & Pine/Hardwood (PPHW)	1,835	11%
Successional Habitats	**Acres**	**Percent of Area**
Early successional (ESF)*	254	2%
Sapling/pole (SPF)	1,826	11%
Mid-successional (MSF)	1,271	8%
Late-successional & old growth (LSOG)	12,592	79%
Other Terrestrial Habitats	**Acres**	**Percent of Area**
Permanent openings (PO)	164	1%
High elevation shrubby habitats (HESH)	22	0%
Snags, dens, downed wood (SDDW)	13,863	86%

*Acres of ESF include burned areas that are not designated in the stands layer of GIS.

Analysis of cumulative effects is limited to those effects of future State or private activities, not involving Federal activities, which are reasonably certain to occur within the action area of the Federal activity subject to consultation. None are known for the project area.

1.2 PROPOSED ACTIONS IN PREFERRED ALTERNATIVE

Alternative D

Activities proposed are listed in Table 2. **Early successional habitat** (ESH) would be created using commercial timber harvest (shelterwood) and non-commercial regeneration. An average basal area (BA) of 15-25 ft^2/acre of shelterwood reserve trees would be left on site to create a two-aged stand structure along with new regeneration.

Thinning would leave a BA of 35-60 ft^2/acre. Gaps up to 2 acres in size would be created for ESH. Damaged and disease trees would be removed first, then scarlet and black oak, red maple, and white pine. Reserve trees in both treatment types would include dens, large mast producing trees, and yellow pines. All early successional and thinned stands would require pre- and post-harvest treatments:

- Pre-harvest site preparation: Midstory species would be controlled with herbicide (Imazapyr and Glyphosate) to reduce post-harvest sprouting of overly-competitive species.
- Post-harvest treatments: One to two years after harvest, use chainsaw slashdown or herbicide (Imazapyr and Glyphosate), and two to four years after harvest, use herbicide (Triclopyr) to reduce competitive sprouts.

- Mast tree seedling plantings (*Early Successional Only*): Seedlings of mast-producing tree species would be planted in regenerated areas to augment natural reproduction.

Group selection with thinning would have no cut inclusions of various sizes. About 20% of the stands would have one to two acre cuts with a residual BA of 0-15 ft^2/acre with thinned portions in between having a BA of 35-60 ft^2/acre. Damaged and disease trees would be removed first, then scarlet and black oak, red maple, and white pine. Reserve trees in both treatment types would include dens, large mast producing trees, and yellow pines.

Crop tree release around selected mast-producing trees would be implemented using chainsaws. **Midstory treatments** with herbicide (Imazapyr and Glyphosate) would reduce the stocking density of understory and midstory trees by 25%.

Prescribed burns (low-intensity) would be conducted using existing roads, streams, dozer and hand tools for control lines. If the burn objectives were not fully met, a follow-up burn would be conducted and may continue on a two to ten year rotation.

Wildlife Habitat Improvements after harvest would include bat roost and nest boxes; construct vernal ponds; and provide grouse drumming logs.

Wetland Restoration would include removing the decommissioned road and restoring the stream channel in Cutshall Bog; controlling encroaching woody plants with chainsaws and/or aquatic approved herbicide (glyphosate); thinning trees and rhododendron at Allen Gap to reduce shading of rare wetland plants.

Maintain existing roads and construct temporary roads: Existing roads would be maintained, and temporary roads would be constructed in support of timber sale activities. Temporary roads would be closed after the timber sale. **Decommission roads**, both authorized and unauthorized, identified in the Paint Creek Transportation Analysis Plan. **Authorize roads** that are existing but not in the Forest Service system.

TABLE 2. PROPOSED ACTIVITIES IN ALTERNATIVE D

Action	Habitat	Successional Stage	# Stands	Area
Early Successional Habitat	Deciduous & White Pine Forests	Sapling/Pole to Late	18	398 acres
Thinning	Deciduous and Pine Forests	Late	8	152 acres
Pre-Harvest Site Preparation	Deciduous and Pine Forests	Sapling/Pole to Late	26	550 acres
Post-Harvest Treatments	Deciduous and Pine Forests	Early	26	550 acres
Tree planting	Deciduous and Pine Forests	Early	18	398 acres
Crop Tree Release	Deciduous and Pine Forests	Early to Sapling/Pole	30	643 acres
Group Selection with Thinning	Pine Forests	Sapling/Pole to Late	4	103 acres
Midstory	Deciduous & White Pine Forests	Sapling/Pole to Late	15	513 acres
Prescribed burns	Deciduous and Pine Forests	Sapling/Pole to Late	3 areas	735 ac.
Wetland Improvement	Wetland	Early	4 areas	36 acres
Nest/Roost Boxes	Deciduous & White Pine Forests	Early	23	34 boxes
Waterholes	Deciduous Forest/Openings	Early	5	5 ponds
Grouse Drumming Logs	Deciduous Forests	-	-	85 logs
Road Maintenance/Reconstruct	Deciduous and Pine Forests	Mixed	-	16.3 miles
Temp & FS Road Construction	Deciduous and Pine Forests	Mixed	-	1.3 miles
Road Decommission	Mixed Forest & Water Crossings	Mixed	-	4.7 miles
Authorize Existing Roads	-	-	-	8.3 miles

Design Criteria

Specific actions will be incorporated into the project design and implementation; only those relating to potential effects of PETS are listed.

1. Use broad-based dips or water bars on all access ways on non-level slopes.
2. Implement Tennessee Best Management Practices (BMPs) as a minimum to achieve soil and water quality objectives. When Forest Plan (RLRMP) Standards exceed BMPs, the standards shall take precedence over Tennessee BMPs.
3. Streamside management zones (riparian corridors and filter zones) would be established, as specified in the RLRMP.
4. Any new threatened, endangered, and/or sensitive species locations discovered within a project area may result in all actions being delayed or interrupted within the area. The appropriate district wildlife/fisheries biologist or botanist would be consulted to determine effects of the action on the species.
5. Trees known to have been used as roosts by Indiana bats are protected from cutting and/or modification until they are no longer suitable as roost trees unless necessary for public safety. Consultation with the US Fish and Wildlife Service (FWS) must occur before cutting or modification.
6. To avoid injury to young Indiana bats, prescribed burning of potential maternity roosting habitat between May 1 and August 15 is prohibited, unless otherwise determined by consultation with the FWS.
7. Snags with exfoliating bark are not intentionally felled unless necessary for public safety. Exceptions may be made for small-scale projects such as insect/disease control, salvage harvesting, and facility construction.
8. During all silvicultural treatments in hardwood forest types, retention priority is given to the largest available trees that exhibit characteristics favored by roosting Indiana bats.
9. Mixing-water for herbicide use would be brought to the site by work crews and not obtained from streams or other bodies of water.
10. No herbicide would be applied within 30 feet of open water except for selective treatments that use herbicides labeled for aquatic use.
11. Skid trails and temporary roads for the purpose of timber harvest would not be constructed for sustained distances over 200 feet in areas with slopes of 40% or greater ("steep area"). The 200-foot length can be exceeded however where the skid trail and/or temporary road is needed to traverse a steep area in order to access the remaining harvest unit(s). Trees within the traversed steep area would not be harvested, except where possible through cable winching to equipment placed outside the steep area.

2.0 CONSULTATION HISTORY

On February 26, 2013, Mary Jennings (FWS) sent a letter to the Cherokee National Forest (CNF) pertaining to project-specific Indiana bat surveys and proposed habitat use study on the north end of the CNF. The letter states that "During the period of the O'Keefe study, a substantial amount of time will be devoted to acoustic and netting surveys. Given this effort, I believe additional, project-

specific bat surveys will not be necessary during the duration of this study to address the potential impacts of CNF projects on the north end of the CNF. Therefore, my staff will no longer be providing recommendations to conduct site-specific bat surveys in conjunction with individual projects…" This project falls under the period of the O'Keefe study, and site-specific bat surveys have not been conducted.

On August 22, 2013, the original Paint Creek BA was completed and sent to the FWS. On September 20 Kenneth McDonald, FWS, sent an email regarding concerns about some of the designations in the Paint Creek BA along with concerns about site-specific Indiana bat surveys and potential adverse effects to Indiana and gray bats. In October, Northern long-eared bat was proposed for listing. In November new information regarding the project resulted in changes to Alternative D (dropping one burn and two crop tree release stands). On November 26, Marcia Carter talked to Kenneth McDonald, FWS, to discuss the concerns and changes to the project. The agreement regarding Indiana bat surveys was clarified, along with the detailed description of prior survey data in the project area. McDonald asked for a more detailed description of herbicide use and supporting rationale for effects analysis. This revised Biological Assessment is a result of these clarifications, changes, and additions.

3.0 SPECIES EVALUATED AND METHODS USED

This BA addresses PETS that are considered to occur or have habitat on the CNF. Analysis of the project was conducted using the best available science, including references from science-based websites, books, papers, reports, state and federal databases, and field surveys. The PETS List on the CNF (Jennings 2011) was reviewed to determine species to consider (Table 3). Information from field surveys and TES database maps identified PETS known to occur in the project area. Project area habitat and species habitat requirements, distributions and limiting factors were used to determine if additional PETS were likely to occur in the project area.

No surveys were specifically conducted to identify PETS species associated with the Paint Creek Project. Bat surveys were conducted in 15 locations across the analysis area from 1998 to 2002 as a part of forest-wide inventories. Fish surveys were conducted in the project area from 2008 to 2012 to determine fish populations and habitat. Standard project level botanical surveys including bryophytes and vascular plants were conducted in the proposed treatment areas in 2013 to locate any rare plants. Botanical surveys were conducted in additional areas related to other projects in 1998. Wetland surveys were conducted in 2012 and 2013 related to habitat restoration.

4.0 HABITAT RELATIONSHIPS, EFFECTS ANALYSIS, AND DETERMINATIONS OF EFFECTS

Based on absence of habitat in the action area or the project occurring outside of the species range, the Paint Creek Project would have "no effect" on the following CNF PETS.

TABLE 3. PETS OF THE CNF WITH A "NO EFFECT" DETERMINATION

Group	Scientific Name	Common Name	Status	Habitat in Project Area	Determination of Effect
Arachnid	*Microhexura montivaga*	Spruce-fir moss spider	E	None	No Effect
Fish	*Cyprinella caerulea*	Blue shiner	T	None	No Effect
Fish	*Erimonax monachus*	Spotfin chub	T	None	No Effect
Fish	*Etheostoma sitikuense*	Citico darter	E	None	No Effect
Fish	*Noturus baileyi*	Smoky madtom	E	None	No Effect
Fish	*Noturus flavipinnis*	Yellowfin madtom	T	None	No Effect
Fish	*Percina antesella*	Amber darter	E	None	No Effect
Fish	*Percina jenkinsi*	Conasauga logperch	E	None	No Effect
Fish	*Percina tanasi*	Snail darter	T	None	No Effect
Mammal	*Glaucomys sabrinus coloratus*	Carolina northern flying squirrel	E	None	No Effect
Mollusk	*Alasmidonta raveneliana*	Appalachian elktoe	E	None	No Effect
Mollusk	*Epioblasma florentina walkeri*	Tan riffleshell	E	None	No Effect
Mollusk	*Epioblasma metastriata*	Upland combshell	E	None	No Effect
Mollusk	*Epioblasma othcaloogensis*	Southern acornshell	E	None	No Effect
Mollusk	*Hamiota altilis*	Fine-lined pocketbook	T	None	No Effect
Mollusk	*Medionidus acutissimus*	Alabama moccasinshell	T	None	No Effect
Mollusk	*Medionidus parvulus*	Coosa moccasinshell	E	None	No Effect
Mollusk	*Pleurobema decisum*	Southern clubshell	E	None	No Effect
Mollusk	*Pleurobema georgianum*	Southern pigtoe mussel	E	None	No Effect
Mollusk	*Pleurobema hanleyianum*	Georgia pigtoe	E	None	No Effect
Mollusk	*Pleurobema perovatum*	Ovate clubshell	E	None	No Effect
Mollusk	*Ptychobranchus greenii*	Triangular kidneyshell	E	None	No Effect
Mollusk	*Villosa trabalis*	Cumberland bean pearly mussel	E	None	No Effect
Reptiles	*Glyptemys muhlenbergii*	Bog turtle	T	None	No Effect
Nonvasc. Plant	*Gymnoderma lineare*	Rock gnome lichen	E	None	No Effect
Vascular Plant	*Geum radiatum*	Spreading avens	E	None	No Effect
Vascular Plant	*Hedyotis purpurea montana*	Roan Mountain bluet	E	None	No Effect
Vascular Plant	*Isotria medeoloides*	Small whorled pogonia	T	None	No Effect
Vascular Plant	*Pityopsis ruthii*	Ruth's golden aster	E	None	No Effect
Vascular Plant	*Solidago spithamaea*	Blue Ridge goldenrod	T	None	No Effect
Vascular Plant	*Spiraea virginiana*	Virginia spiraea	T	None	No Effect

4.1 GRAY BAT *(Myotis grisescens)*

Habitat Relationships

This bat is found throughout the limestone region of southern middle-western and southeastern United States (Whitaker 1998). It has been documented at 11 locations on the CNF, most on the North End including the Paint Creek watershed. Gray bats use caves year-round for hibernating, maternity colonies, and roosting. They forage for insects over water along riparian areas and shorelines with forest cover (USFWS 1982). They feed primarily on flying insects such as mayflies, moths, flies, and beetles (LaVal 1977).

Gray bats are threatened by the destruction of hibernacula (USFWS 1982) and white nose syndrome, a fungus that attacks hibernating bats. White nose syndrome has now been found in

Tennessee. Large-scale population declines may occur in the future as the disease continues to spread.

Environmental Baseline

The closest cave to the project area where gray bats have been found is approximately three miles away, in the Nolichucky River watershed. Indiana bat mist net surveys were conducted in the Paint Creek area in the summers of 1998, 1999, and 2002. Each site was sampled using two to five net sets, using two to 18 meter wide nets with mesh size of 3 cm, 30 or 50 denier/2-ply nylon. Nets were tended from dusk to 2:00 am. During the 1998 surveys, 16 gray bats were captured at one site foraging along Paint Creek, including pregnant and lactating females (Kiser 1999). No gray bats were captured during surveys conducted along tributaries to Paint Creek.

Foraging habitat for gray bat is present along the main channel of Paint Creek. Tributaries to Paint Creek are typically small streams with dense stands of rhododendron along the banks and up the slopes. Rhododendron branches lean out over the stream from both sides, intertwining and making a relatively thick wall of vegetation over the water surface and across the riparian forest up to 15 feet high. Since gray bats generally forage within ten feet of the water surface (LaVal 1977), these dense stands of rhododendron would make flying along stream corridors and adjacent riparian forests difficult, and would be unsuitable foraging habitat.

The environmental baseline includes the effects of all past and present Federal, State, and private actions within the Paint Creek action area. No Federal actions have occurred in the last five years in the action area. The Bellcow Mountain prescribed burn (1,818 acres) is scheduled to occur in 2014-2015. The burn is near the smaller tributaries of Paint Creek, and would occur during dormant season when gray bats are not present. Burning along streams is of very low intensity or it may not burn at all. The burn would have discountable to no effects on gray bats. No State or private actions have occurred that affected gray bat.

Direct and Indirect Effects

No direct effects are expected for gray bat. Habitat associated with caves would not be impacted because no caves are located within the action area. Hibernacula and maternity colony habitat would not be affected. Proposed activities would occur during the day while bats are roosting in caves and are absent from the project area.

Six early successional, two thinning, two group selection, eight midstory, and 13 crop tree release stands are adjacent to small streams that are densely populated with rhododendron or other vegetation. Because of the rhododendron, these streams would not be suitable foraging habitat for gray bat. Riparian zone restrictions (no harvest within 100 feet of perennial streams) and streamside buffer zones (no ground disturbance) would protect foraging habitat downstream from changes to vegetation and water quality. Activities in the remaining stands would have no indirect effects on gray bay.

Herbicides would be used to control woody vegetation and treat non-native invasive species. Glyphosate, Imazapyr, and Triclopyr would be used for both pre- and post-harvest site treatments in all stands proposed for early successional forest creation. Imazapyr and Glyphosate would be used for both pre- and post-harvest site treatments in stands proposed for thinning and midstory treatment. Glyphosate would also be used to treat approximately two acres of encroaching woody vegetation within and along the edges of a small wetland at Allen Gap, restoring it to a more open condition.

The herbicides used for treatments would not contact bats directly, but may be present in trace amounts on an occassional insects ingested by bats, although the likelihood of this occurrence is discountable. Stands proposed for treatment are along the small tributaries where gray bats are not likely to forage. The closest treatment to the main channel of Paint Creek is over 0.1 mile. The following factors would further minimize the risk of contamination: 1) herbicide applied in small amounts; 2) very specific methods of application such as thinline application on stems or stump treatments; and 3) design criteria for herbicide use such as timing to avoid rainfall and 30-foot buffer zones. Timing of application and quantities applied would ensure that no measurable effects to water quality would occur even in aquatic scenarios. See Attachment A –Herbicide Use Assumptions for herbicides to be used. Effects of the individual herbicides can be found below.

- *Glyphosate* is categorized by the Environmental Protection Agency (EPA) as practically non-toxic to honeybees, fish, and aquatic invertebrates and that the effects on mammals and most endangered terrestrial organisms are minimal (exceptions are plants and a toad - due to habitat). Glyphosate is excreted in waste and is not bioaccumulated in animals (EPA 1993). Risk characterizations for glyphosate indicated that mammals are not at risk (SERAg 2011).
- *Imazapyr* is categorized by EPA as practically non-toxic to mammals, birds, honeybees, fish, and aquatic invertebrates. EPA has determined that there are no risks of concern to terrestrial mammals and bees or to aquatic invertebrates (EPA 2006). Imazapyr does not bioaccumulate in mammals, as it is rapidly excreted in waste (WDOT 2006), and does not bioaccumulate in aquatic organisms (SERAi 2011).
- *Triclopyr* is categorized by EPA as practically non-toxic to mammals, insects, and freshwater invertebrates (EPA 1998). Applications of triclopyr at the rate they would be used in the Paint Creek project are not likely to cause adverse effects to small mammals or changes in populations due to changes in vegetation. Triclopyr has not been found to bioaccumulate in mammals or aquatic organisms. No risks from exposure to triclopyr are apparent for aquatic invertebrates (SERAt 2011).

Prescribed burning would have no direct effects because gray bats would not be present during burning. Burns would be conducted in fall/winter/early spring when gray bats are still in hibernation. Fire would be ignited along the upper slopes, backing down toward riparian corridors. Fire in riparian corridors is often patchy or goes out when it reaches the moist conditions in these areas. Only one of the proposed units, Brushy Branch Burn, is ajacent to suitable foraging habitat along Paint Creek. The others are along the small triutaries where suitable foraging habitat does not occur. This burn would have indirect beneficial impacts for gray bat by increasing the light intensity in the understory which in turn increases insect production. The increase in insect production would provide better foraging opportunities for gray bat along Paint Creek.

Road maintenance, decommissioning, obliteration, recontouring, and wetland restoration would improve water quality in the Paint Creek drainage where gray bats may forage. Road authorization, temporary road construction, tree planting, nest boxes, waterhole construction, and grouse drumming log installation would have no effect on gray bat.

Cumulative Effects

Private land within the analysis area is predominantly in forested condition and no known future activities are expected to occur. Therefore, no cumulative effects to gray bats would occur.

Determination of Effect

Due to the limited nature of foraging habitat in the action area and timing of burning, effects of most activities would be discountable. Some effects may be slightly beneficial. The proposed project ***may effect, not likely to adversely affect*** gray bat.

4.2 INDIANA BAT (*Myotis sodalis*)

Habitat Relationships

Indiana bat occurs from Vermont to Michigan, south to South Carolina, west to Alabama, Indiana to Arkansas, and Oklahoma. Only nine hibernacula in three states (KY, IN, MO) harbor 75% of the remaining population (NatureServe 2012). No hibernacula are known from the CNF, but one is located in the Great Smoky Mountains National Park, where several maternity roosts have been located. Four additional hibernacula are located within 40-70 miles of the CNF.

In the Southern Appalachian region, females currently establish primary maternity roosts under the sloughing bark of dead yellow and white pines and eastern hemlock (O'Keefe 2012). Single bats may use a variety of tree species for roosts, as long as there is available sloughing bark or crevices on those trees. The majority of roosts are on mid and upper slopes in mixed pine-hardwood stands, but some roosts have been found near streams. Caves are used for hibernacula. The Indiana bat returns to hibernacula beginning in late August. The species forages for flying insects along waterways, floodplains, and over upland waterholes (NatureServe 2012).

Indiana bats are threatened by white nose syndrome, a fungus that attacks hibernating bats. White nose syndrome has now been found in Tennessee. Large-scale population declines are expected over the next several years as the disease continues to spread.

Environmental Baseline

On the CNF, this bat has only been documented on the southern districts, and has not been captured in the project area or on the North End. Indiana bat surveys have been conducted on the north end of the CNF every year since 1998, with over 1,000 net nights. Indiana bat mist net surveys were conducted in the Paint Creek area in the summers of 1998, 1999, and 2002. Each site was sampled using two to five net sets, using two to 18 meter wide nets with mesh size of 3 cm, 30 or 50 denier/2-ply nylon. Nets were tended from dusk to 2:00 am. ANABAT detectors were also used in surveys conducted in 2002. No Indiana bats were captured or detected in any surveys in Paint Creek or across the northern CNF.

On February 26, 2013, Mary Jennings (FWS) sent a letter to the CNF pertaining to project-specific Indiana bat surveys and proposed habitat use study on the north end of the CNF. The letter states that "During the period of the O'Keefe study, a substantial amount of time will be devoted to acoustic and netting surveys. Given this effort, I believe additional, project-specific bat surveys will not be necessary during the duration of this study to address the potential impacts of CNF projects on the north end of the CNF. Therefore, my staff will no longer be providing recommendations to conduct site-specific bat surveys in conjunction with individual projects…" This project falls under the period of the O'Keefe study, and site-specific bat surveys have not been conducted for the Paint Creek Project. Although Indiana bats have not been captured in the Paint Creek area, foraging, roosting, and potential maternity habitats are available in the action area.

The environmental baseline includes the effects of past and present of all Federal, State, and private actions within the Paint Creek action area. No Federal actions have occurred in the last five years in the action area. The Bellcow Mountain prescribed burn (1,818 acres) is scheduled to occur in 2014-2015. The burn would occur during dormant season when Indiana bats are not present. The Bellcow Mountain burn would have the same types of effects as will be discussed in the effects analysis for proposed burning in the Paint Creek Project. No State or private actions have occurred that affected Indiana bat.

Direct and Indirect Effects

The potential of the project to directly impact Indiana bats is discountable, extremely low to non-existent. There are no known hibernacula on the CNF, no caves are present in the project area, and no Indiana bats have been found on the North End of the CNF. Should an Indiana bat roost site be discovered prior to and/or during project implementation, project activities would stop, and the CNF would again consult with the FWS.

The proposed project would indirectly affect Indiana bat by alteration of roosting and foraging habitat. Removal of trees during early successional activities, thinning, group selection, temporary road construction, and road obliteration would contribute to the loss of future roosting habitat. However, Indiana bats have adapted to these types of situations as roost trees are temporary in nature (O'Keefe 2011). The 15-20 basal area per acre (BA) remaining in early successional areas and 35-60 BA in the thinned area would ensure that roosting habitat would continue to be available in harvested stands over the next five years. The RLRMP requires the largest trees with favorable conditions for roosting bats to be left. It also requires retention of all shagbark hickory trees (>6 inch diameter) and snags with exfoliating bark. New snags would develop from trees damaged during harvest, creating roosting habitat in the future. Installation of bat boxes would also provide additional roosting habitat. The overall effect of these activities would provide open patches of forest with standing snags for roosting. The open condition of these areas would make roosting habitat more suitable by providing more sunlight to maintain warmer conditions in the roost.

Creation of early successional habitat, thinning, group selection, midstory, and crop tree release would increase light intensity and herbaceous plant diversity for the next five to ten years. These activities would increase insect production and improve forage conditions for bats. Construction of vernal ponds would supply upland water sources and improve foraging conditions.

The herbicides used for post harvest and midstory treatments are unlikely to contact Indiana bats, due to the low probability that Indiana bats are present. The effects of herbicides on mammals are described in the gray bat effects section. Indirect effects of herbicide treatments would increase light intensity and herbaceous plant diversity, increasing insect production and forgaing conditions.

Dormant season burning would have no direct effects on Indiana bats because burning would take place when bats are not present. However, foraging, roosting, and maternity colony habitat may be altered. Prescribed fire over a large area generally burns in a mosaic pattern, with some areas burning completely while others little to none, particularly in moist coves. Although prescribed fire activities may eliminate some potential roosting and maternity colony snags or live trees, fire would also create new snags, providing additional roosting habitat. New snags are needed over time as old snags deteriorate and lose sloughing bark. Since roost trees are ephemeral, bats are adapted to finding new roost trees should previous roosts be lost during the fire.

Burns would have indirect beneficial impacts for Indiana bat by increasing the herbaceous layer in the understory which in turn increases insect production. The increase in insect production would provide better foraging opportunities for Indiana bat. Suitable habitat would remain within the burned area and habitat conditions would be improved.

Road maintenance, decommissioning, obliteration, recontouring, and wetland restoration would improve water quality in the Paint Creek watershed, possibly improving foraging habitat. Road authorization, temporary road construction, tree planting, nest boxes, waterhole construction, and grouse drumming log installation would have no effect on Indiana bat.

Cumulative Effects

Private land within the analysis area is predominantly in forested condition and no known future activities on are expected to occur. Therefore, no cumulative effects to Indiana bats would occur.

Determination of Effect

The proposed project is likely to improve foraging habitat available for Indiana bat. It also provides for an abundance of trees and snags that are available for use as maternity and roost trees. Existing forest standards and guidelines will provide a level of protection and provide habitat to ensure that management activities will not jeopardize the continued existence of the species.Less than four percent of the potential roosting habitat would be impacted in the Paint Creek watershed.

The proposed project ***may effect, not likely to adversely affect*** Indiana bat because adverse effects would be discountable and some effects would be beneficial.

4.3 NORTHERN LONG-EARED BAT (*Myotis septentrionalis*)

Habitat Relationships

Northern long-eared bat (NLEB) is found throughout the eastern United States and Canada (Caceres 2000). This bat uses caves and man-made structures for hibernation. They leave their hibernacula in March and April and return in August and September (USFWS 2013).

In summer roost singly or in small colonies, mainly in trees but occasionally in caves. NLEB typically use large, tall trees (either live or dead) and roost under loose bark or in cavities or crevices. NLEB are somewhat opportunistic when selecting roost trees, not depending on a particular tree species. Structural complexity of roosting habitat may be more important. Forest canopy cover has been found to range from 56 to 84%, with some studies finding roosts in stand with lower canopy cover than the surrounding forest, particularly females (USFWS 2013).

NLEB forage for insects by hawking and gleaning on forested ridges and hillsides. Gleaning behavior suggests that these bats have the ability to maneuver and forage in a cluttered environment (USFWS 2013).

The single greatest threat to NLEB is white nose syndrome, a disease caused by a fungus that attacks hibernating bats (USFWS 2013). Large-scale population declines may occur in the future as the disease continues to spread.

Environmental Baseline

On the CNF, this bat has been documented in nearly 200 locations, most on the North End. Mist net and ANABAT surveys have been conducted on the north end of the CNF every year since 1998, with over 1,100 net nights and 1,000 captures. Based on the ratio of NLEB captures to net nights for CNF surveys for the last 10 years, the trend is positive. According to FWS representative at the TN Bat Working Group meeting in November 2013, Appalachian populations of cave bats are down slightly in 2013, but overall are stable. NLEB were absent in some coves in late winter. The population numbers of NLEB are highest in Kentucky and Tennessee (Miller 2013). Foraging, roosting, and potential maternity habitats are available in the action area. No hibernacula occur in or near the action area.

Indiana bat mist net surveys were conducted in the Paint Creek area in the summers of 1998, 1999, and 2002. Each site was sampled using two to five net sets, using two to 18 meter wide nets with mesh size of 3 cm, 30 or 50 denier/2-ply nylon. Nets were tended from dusk to 2:00 am. During the surveys, a total of 39 NLEB were captured in seven out of 13 sites; six of the sites had no bat captures.

The environmental baseline includes the effects of past and present of all Federal, State, and private actions within the Paint Creek action area. No Federal actions have occurred in the last five years in the action area. The Bellcow Mountain prescribed burn (1,818 acres) is scheduled to occur in 2014-2015. The burn would occur during dormant season when Indiana bats are not present. The Bellcow Mountain burn would have the same types of effects as will be discussed in the effects analysis for proposed burning in the Paint Creek Project. No State or private actions have occurred that affected Indiana bat.

Direct and Indirect Effects

If individuals are present in areas where early successional forest creation, thinning, group selection, temporary road construction, and road obliteration is conducted, tree removal may disturb or cause inadvertent loss of individual bats or small groups roosting in trees that are cut or pushed over. The RLRMP requires the largest trees with favorable conditions for roosting bats to be left. It also requires retention of all shagbark hickory trees (>6 inch diameter) and snags with exfoliating bark. This would protect most roosting bats from harm. If harvest disturbs roost trees it could cause the bats to increase roost dispersal, leading to fewer shared roost trees. These lower group numbers could decrease the spread of disease (USFWS 2013).

Removal of trees during early successional activities, thinning, group selection, temporary road construction, and road obliteration would contribute to the loss of future roosting habitat. However, NLEB are opportunistic and flexible in roost tree selection. This flexibility in roosting may allow NLEB to be adaptable in managed forests and avoid competition for roosting habitat with more specialized species (USFWS 2013).

The 15-20 basal area per acre (BA) remaining in early successional areas and 35-60 BA in the thinned area would ensure that roosting habitat would continue to be available in harvested stands over the next five years. The RLRMP requires the largest trees with favorable conditions for roosting bats to be left. It also requires retention of all shagbark hickory trees (>6 inch diameter) and snags with exfoliating bark. New snags would develop from trees damaged during harvest, creating roosting habitat in the future. Installation of bat boxes would also provide additional roosting habitat. The overall effect of these activities would provide open patches of forest with standing snags for roosting. The open condition of these areas would make roosting habitat more suitable by providing more sunlight to maintain warmer conditions in the roost. Female NLEB have

been found to prefer roosts with lower canopy cover most likely for increased solar radiation for pup development and for greater ease for pups learning to fly (USFWS 2013).

Creation of early successional habitat, thinning, group selection, midstory, and crop tree release would increase light intensity and herbaceous plant diversity for the next five to ten years. These activities would increase insect production and improve forage conditions for NLEB. Construction of vernal ponds would supply upland water sources and improve foraging conditions.

Herbicides would be used to control woody vegetation and treat non-native invasive species. Glyphosate, Imazapyr, and Triclopyr would be used for both pre- and post-harvest site treatments in all stands proposed for early successional forest creation. Imazapyr and Glyphosate would be used for both pre- and post-harvest site treatments in stands proposed for thinning and midstory treatment. Glyphosate would also be used to treat approximately two acres of encroaching woody vegetation within and along the edges of a small wetland at Allen Gap, restoring it to a more open condition.

The herbicides used for treatments would not contact bats directly, but may be present in trace amounts on an occassional insect ingested by bats, although the likelihood of this occurrence is small. The following factors would further minimize the risk of contamination: 1) herbicide applied in small amounts; 2) very specific methods of application such as thinline or stump treatments; and 3) design criteria for herbicide use such as timing to avoid rainfall and 30-foot buffer zones. Timing of application and quantities applied would ensure that no measurable effects to water quality would occur even in aquatic scenarios. See Attachment A –Herbicide Use Assumptions for herbicides to be used. Effects of the individual herbicides can be found below.

- *Glyphosate* is categorized by EPA as practically non-toxic to honeybees, fish, and aquatic invertebrates and that the effects on mammals are minimal, including most endangered terrestrial organisms (exceptions are plants and a toad - due to habitat). Glyphosate is excreted in waste and is not bioaccumulated in animals (EPA 1993). Risk characterizations for glyphosate indicated that mammals are not at risk (SERAg 2011).
- *Imazapyr* is categorized by EPA as practically non-toxic to mammals, birds, honeybees, fish, and aquatic invertebrates. EPA has determined that there are no risks of concern to terrestrial mammals and bees or to aquatic invertebrates (EPA 2006). Imazapyr does not bioaccumulate in mammals, as it is rapidly excreted in waste (WDOT 2006), and does not bioaccumulate in aquatic organisms (SERAi 2011).
- *Triclopyr* is categorized by EPA as practically non-toxic to mammals, insects, and freshwater invertebrates (EPA 1998). Applications of triclopyr at the rate they would be used in the Paint Creek project are not likely to cause adverse effects to small mammals or changes in populations due to changes in vegetation. Triclopyr has not been found to bioaccumulate in mammals or aquatic organisms. No risks from exposure to triclopyr are apparent for aquatic invertebrates (SERAt 2011).

Dormant season burning would have no direct effects on NLEB because burning would take place when bats are not present. However, foraging, roosting, and maternity colony habitat may be altered. Prescribed fire over a large area generally burns in a mosaic pattern, with some areas burning completely while others little to none, particularly in moist coves. Although prescribed fire activities may eliminate some potential roosting and maternity colony snags or live trees, fire would also create new snags, providing additional roosting habitat. New snags are needed over

time as old snags deteriorate and lose sloughing bark. Since roost trees are ephemeral, bats are adapted to finding new roost trees should historic roosts be lost during the fire.

Burns would have indirect beneficial impacts for NLEB by creating open woodland habitat, increasing the herbaceous layer in the understory which in turn increases insect production (Lacki et. al 2009). The increase in insect production would provide better foraging opportunities for NLEB. Suitable habitat would remain within the burned area and habitat conditions would be improved.

Road maintenance, decommissioning, obliteration, recontouring, and wetland restoration would improve water quality in the Paint Creek watershed where bats may forage. Road authorization, temporary road construction, tree planting, nest boxes, waterhole construction, and grouse drumming log installation would have no effect on NLEB.

Cumulative Effects

Private land within the analysis area is predominantly in forested condition and no known future activities on are expected to occur. Therefore, no cumulative effects to Northern long-eared bats would occur.

Determination of Effect

The proposed project is likely to improve foraging habitat available for Nothern long-eared bat. It also provides for an abundance of trees and snags that are available for use as maternity and roost trees. Existing forest standards and guidelines will provide a level of protection and provide habitat to ensure that management activities will not jeopardize the continued existence of the species.

Although the likelihood is very low, the proposed action may result in the inadvertent loss of individual or small groups of Northern long-eared bats, via removal of some trees occupied by bats during the spring or summer months. Less than four percent of the potential roosting habitat would be impacted in the Paint Creek watershed.

The project is ***not likely to jeopardize the continued existence of the species or result in destruction or adverse modification of proposed critical habitat*** of Northern long-eared bat because it would not be expected to reduce appreciably the likelihood of both survival and recovery of the species due to the low likelihood of adverse effects, widespread distribution, and population trend on the CNF.

5.0 SUMMARY OF EFFECTS DETERMINATIONS

Table 4 summarizes the determinations of effect for each species.

TABLE 4. DETERMINATIONS OF EFFECT FOR ALTERNATIVE D

Species	Federal Status	Determination of Effect
Gray Bat	Endangered	May effect, not likely to adversely affect
Indiana Bat	Endangered	May effect, not likely to adversely affect
Northern Long-eared Bat	Proposed	Not likely to jeopardize the continued existence of the species or result in destruction or adverse modification of proposed critical habitat

6.0 SIGNATURE OF PREPARER

/s/ Marcia S. Carter
North Zone Fisheries Biologist
December 4, 2013

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8.0 ATTACHMENT A – HERBICIDE USE ASSUMPTIONS

PAINT CREEK PROJECT ALTERNATIVE D

Treatment	Glyphosate (acres)	Imazapyr (acres)	Triclopyr (acres)
a. Pre-harvest site preparation [1]	547	547	0
b. Post-harvest treatment [1, 2]	547	547	547
c. Midstory treatment	513	513	0
d. Wetland restoration	36	0	0
Total acres	**1643**	**1607**	**547**

[1] Includes both early successional forest creation and thinning treatment.

[2] Assumes the maximum number of acres to be treated; however, the actual number of acres treated would be fewer since not all stands would receive post-harvest site preparation .This applies to the amount of herbicide used, calculated below, as well.

Treatment	Herbicide	Acres	Area Treated [3]	Typical Usage Rate [4] (lbs/acre)	Lbs of Acid Equivalent
a, c	Glyphosate	1060	0.06	2.00	127.2
a, c	Imazapyr	1060	0.06	0.15	9.5
a, c	Triclopyr	0	0.06	0.50[5]	0.0
b	Glyphosate	547	0.06	2.00	65.6
b	Imazapyr	547	0.06	0.02[6]	0.7
b	Triclopyr	547	0.06	0.05[6]	1.6
d	Glyphosate	36	0.06	2.00	4.3
Total pounds (lbs) of acid equivalent					**209.0**

[3] For site preparation and midstory treatments, approximately 200 spots or less are treated/acre. Assuming a liberal spot average of 4 feet in diameter (2-foot radius), 6% of the acre would be treated: [((2 feet)^2 x 3.14) x 200] ÷ 43560 ft^2/acre = 0.06. Herbicide use in wetland restoration areas would be similar to that of a thinning.

[4] The SERA Risk Assessments give typical Forest Service use rates per herbicide as:

- Glyphosate: Typical FS usage rate is 2 lbs. of acid equivalent (a.e.) per acre
- Imazapyr: Typical FS usage rate is 0.15 lbs. a.e/acre.
- Triclopyr: Typical FS usage rate is 1 lb. a.e./acre.

[5] In (a) and (c), when Triclopyr is used in combination, it is used at half mixture, cutting the use rate in half.

[6] In (b), the amount of herbicide used in a post-harvest stand is 1/10th of that used in pre-harvest stands.

Total acid equivalent use for Alternative D is 209 lbs over 1060* acres (a + c) = 0.20 lbs/acre

* Treatment area b is the same area as a

APPLICATION METHODS

Foliar spray: Herbicide is selectively applied to the leaf surfaces of the targeted plant.

Hack-and-squirt: Incisions are made around the stem and herbicide is applied into this cut.

Streamline: Herbicide is applied in a stream to the stem of the targeted plant.

Cut surface: The targeted plant is cut off and herbicide is applied to the stump.